

MATERIAL SAFETY DATA SHEET PACKET

National Institute of Standards and Technology
Standard Reference Materials Program
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RM Number: 8559, 8560, 8561
MSDS Number: 8559-8560 and 8561
RM Name: 8559 - Natural Gas
(Coal Origin)
8560 - Natural Gas
(Petroleum Origin)
8561 - Natural Gas
(Biogenic)

Date of Issue: 10 May 2004

Reference Materials RM 8559, RM 8560, and RM 8561 are natural gas samples intended to provide compound specific reference values for isotopic composition and uncertainty with $^{13}\text{C}/^{12}\text{C}$ ratios expressed in parts per thousand relative to the VPDB (Vienna Peedee Belemnite) standard. Each RM consists of a 50-milliliter stainless steel cylinder sealed with an all-metal seat in a bellows valve. The set contains the following materials with respective Material Safety Data Sheet (MSDS):

RM 8559 – Natural Gas of Coal Origin (>80 % Methane)
RM 8560 – Natural Gas of Petroleum Origin (>50 % Methane)
RM 8561 – Biogenic Natural Gas (>95 % Methane)

MATERIAL SAFETY DATA SHEET

SRM Supplier: National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2320
Gaithersburg, Maryland 20899-2320

RM Number: 8559-8560
MSDS Number: 8559-8560
RM Name: 8559 - Natural Gas
(Coal Origin)
8560 - Natural Gas
(Petroleum Origin)

Date of Issue: 10 May 2004

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SECTION I. MATERIAL IDENTIFICATION

Material Name: Natural Gas

Description: Reference Materials RM 8559 and RM 8560 are natural gas samples intended to provide compound specific reference values for isotopic composition and uncertainty with $^{13}\text{C}/^{12}\text{C}$ ratios expressed in parts per thousand relative to the VPDB (Vienna Pee Dee Belemnite) standard. RM 8559 is a natural gas of coal origin (>80 % methane), while RM 8560 is a natural gas of petroleum origin (>50 % methane). Each RM consists of a 50 mL stainless steel cylinder sealed with an all-metal seat in a bellows valve. Each cylinder contains about 10 mmol (approximately 2 g) of gas compressed to about 5 MPa (800 psia).

Other Designations: Natural Gas (gas fuels; sweet natural gas; marathon natural gas)

Name	Chemical Formula	CAS Registry Number
Natural Gas	Hydrocarbons Mixture	8006-14-2

DOT Classification: Flammable Gas; Class Hazard 2.1; ID No. UN1971; Methane

SECTION II. HAZARDOUS INGREDIENTS

Hazardous Component	Nominal Concentration (%)	Exposure Limits and Toxicity Data
Natural Gas	100	OSHA TWA: 1800 mg/m ³
		ACGIH TWA: 1800 mg/m ³
		simple asphyxiant

SECTION III. PHYSICAL/CHEMICAL CHARACTERISTICS

Natural Gas	
Appearance: colorless	Volatility (%): 100
Odor: varying odor	Boiling Point (°C): -161 to -88
Odor Threshold: not available	Freezing Point (°C): -183
Vapor Density (air = 1): 0.8	Water Solubility: insoluble

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Flash Point (°C): -180 **Method Used:** Not Applicable **Autoignition Temperature(°C):** 482 – 670

Flammability Limits in Air (Volume %): **UPPER:** 13 to 17
LOWER: 3.8 to 6.5

Unusual Fire and Explosion Hazards: Natural gas is a severe fire hazard. Vapor/air mixtures are explosive. Vapors or gasses may ignite at distant ignition sources and flash back. Containers may rupture or explode if exposed to heat.

Extinguishing Media: Use carbon dioxide or dry chemical.

Special Fire Procedures: Fire fighters should wear full protective clothing and self-contained breathing apparatus (SCBA) when this material is involved in a fire. Keep cylinders cool with water spray. If possible, stop the product flow. Move the cylinder from fire area if it can be done without risk.

SECTION V. REACTIVITY DATA

Stability: X Stable _____ Unstable

Stable at normal temperature and pressure.

Conditions to Avoid: Avoid heat, flames, sparks and other sources of ignition. Protect cylinders from physical damage. Containers may rupture or explode if exposed to heat. Dangerous gases may accumulate in confined spaces. **DO NOT** store in poorly ventilated areas.

Incompatibility (Materials to Avoid): Natural gas is incompatible with oxidizing materials.

See Section IV: "Fire and Explosion Hazard Data"

Hazardous Decomposition or Byproducts: Thermal decomposition of natural gas will produce oxides of carbon.

Hazardous Polymerization _____ Will Occur X Will Not Occur

SECTION VI. HEALTH HAZARD DATA

Route of Entry: X Inhalation X Skin _____ Ingestion

Health Hazards (Acute and Chronic): Natural gas is a simple asphyxiant. Concentrations of 5 % to 8 % produced fetal brain abnormalities such as brain hernias and hydrocephalus in pregnant mice. The symptoms of asphyxia depend on the rapidity with which oxygen deficiency develops and how long it continues. In sudden acute asphyxia, unconsciousness may be immediate. With slow development, there may be rapid respiration and pulse, air hunger, dizziness, reduced awareness, tightness in the head, tingling sensations, incoordination, faulty judgment, emotional instability, and rapid fatigue. As the asphyxia progresses, nausea, vomiting, collapse, unconsciousness, convulsions, deep coma, and death are possible.

Skin contact with the liquid form of this gas may cause frostbite with redness, tingling and pain, or numbness. In more severe cases, the skin may become hard and white with the development of blisters. Eye contact with the liquid form of this gas may cause pain and blurred vision.

NOTE: Ensure adequate ventilation when using this material.

Medical Conditions Generally Aggravated by Exposure: Not Established

Listed as a Carcinogen/Potential Carcinogen:

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens	_____	<u> X </u>
In the International Agency for Research on Cancer (IARC) Monographs	_____	<u> X </u>
By the Occupational Safety and Health Administration (OSHA)	_____	<u> X </u>

EMERGENCY AND FIRST AID PROCEDURES:

Skin Contact: If frostbite or freezing occurs, immediately flush with plenty of lukewarm water (105 °F to 115 °F; 41 °C to 46 °C). **DO NOT USE HOT WATER.** If warm water is not available, gently wrap affected parts in blankets. Get immediate medical assistance.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance immediately.

Inhalation: If adverse effects occur, move the victim to fresh air. If breathing is difficult, give oxygen. If the victim is not breathing, give artificial respiration by qualified personnel. Obtain immediate medical assistance.

Ingestion: If a large amount is ingested, seek immediate medical attention.

NOTE TO PHYSICIAN: For inhalation, consider oxygen.

TARGET ORGAN(S) OF ATTACK: None reported.

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material Is Released: Ventilate closed spaces before entering. Remove leaking cylinder to exhaust hood or safe outdoor area. Avoid heat, flames, sparks and other sources of ignition. Reduce vapors with water spray. Keep unnecessary people away; isolate hazard area and deny entry.

Waste Disposal: Natural gas is subject to U.S. EPA disposal regulations (EPA 40, CFR 262); Hazardous Waste Number D001. Dispose in accordance with all federal, state and local regulations. **DO NOT** return the empty cylinder to the supplier. The cylinder is the property of the purchaser.

Handling and Storage: Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.1001. Keep separated from incompatible substances. Secure and protect cylinder from falling. Store in a cool, dry place and well-ventilated area. Use local exhaust ventilation system. Ventilation equipment should be explosion-resistant if explosive concentrations are present. Keep containers tightly closed when not in use. Keep valve protective cap on cylinder when not in use. Wear safety goggles, safety shoes, and insulated gloves when handling or using cylinders. An eye wash station and drench shower should be readily available near handling and use areas.

NOTE: Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the laboratory.

SECTION VIII. SOURCE DATA/OTHER COMMENTS

Sources: MDL Information Systems, Inc., MSDS *Natural Gas*, 15 December 2003.

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The reference values for this material are given in the NIST Report of Investigation.

MATERIAL SAFETY DATA SHEET

SRM Supplier: National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2320
Gaithersburg, Maryland 20899-2320

RM Number: 8561
MSDS Number: 8561
RM Name: Natural Gas – Biogenic
(Methane)
Date of Issue: 10 May 2004

MSDS Coordinator: Mario J. Cellarosi
Phone: (301) 975-6776
ChemTrec: 1-800-424-9300

FAX: (301) 926-4751
E-mail: SRMMSDS@nist.gov

SECTION I. MATERIAL IDENTIFICATION

Material Name: Natural Gas – Biogenic (Methane)

Description: Reference Material 8561 is a biogenic natural gas sample (>95 % methane) intended to provide compound specific reference values for isotopic composition and uncertainty with ¹³C/¹²C ratios expressed in parts per thousand relative to the VPDB (Vienna Pee Dee Belemnite) standard. This RM consists of a 50 mL stainless steel cylinder sealed with an all-metal seat in a bellows valve. The cylinder contains about 10 mmol (approximately 2 g) of gas compressed to about 5 MPa (800 psia).

Other Designations: Methane (marsh gas; methyl hydride; natural gas)

Name	Chemical Formula	CAS Registry Number
Methane	CH ₄	74-82-8

DOT Classification: Flammable Gas; Class Hazard 2.1; ID No. UN1971; Methane

SECTION II. HAZARDOUS INGREDIENTS

Hazardous Component	Nominal Concentration (%)	Exposure Limits and Toxicity Data
Methane	>90	simple asphyxiant

SECTION III. PHYSICAL/CHEMICAL CHARACTERISTICS

Methane	
Appearance: colorless and odorless	Volatility (%): 100
Taste: tasteless	Boiling Point (°C): -162
Molecular Weight: 16.04	Freezing Point (°C): -183
Vapor Density (air = 1): 0.555	Water Solubility (% @ 17 °C): 3.5
Vapor Pressure (°C @ 760 mm Hg): -161	Solvent Solubility: soluble in ether, alcohol, benzene, and organic solvents

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

fatigue. As the asphyxia progresses, nausea, vomiting, collapse, unconsciousness, convulsions, deep coma, and death are possible.

NOTE: Ensure adequate ventilation when using this material.

Medical Conditions Generally Aggravated by Exposure: Not Established

Listed as a Carcinogen/Potential Carcinogen:

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens	_____	<u> X </u>
In the International Agency for Research on Cancer (IARC) Monographs	_____	<u> X </u>
By the Occupational Safety and Health Administration (OSHA)	_____	<u> X </u>

EMERGENCY AND FIRST AID PROCEDURES:

Skin Contact: Remove contaminated shoes and clothing. Rinse affected area with copious amounts of water for at least 15 minutes while removing contaminated clothing. Obtain medical assistance if necessary.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance immediately.

Inhalation: If adverse effects occur, move the victim to fresh air. If breathing is difficult, give oxygen; if the victim is not breathing, give artificial respiration by qualified personnel. Obtain immediate medical assistance.

Ingestion: If a large amount is ingested, seek immediate medical attention.

NOTE TO PHYSICIAN: For inhalation, consider oxygen.

TARGET ORGAN(S) OF ATTACK: None reported.

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material Is Released: Ventilate closed spaces before entering. Remove leaking cylinder to exhaust hood or safe outdoor area. Avoid heat, flames, sparks and other sources of ignition. Reduce vapors with water spray. Keep unnecessary people away, isolate hazard area and deny entry.

Waste Disposal: Methane gas is subject to U.S. EPA disposal regulations (EPA 40, CFR 262); Hazardous Waste Number D001. Dispose in accordance with federal, state and local regulations. **DO NOT** return the empty cylinder to the supplier. The cylinder is the property of the purchaser.

Handling and Storage: Store and handle in accordance with all current regulations and standards. Keep separated from incompatible substances. Secure and protect cylinder from falling. Store in a cool, dry place and well-ventilated area. Provide local exhaust ventilation system. Ventilation equipment should be explosion resistant if explosive concentrations are present. Keep containers tightly closed when not in use. Keep valve protective cap on cylinder when not in use. Keep separated from incompatible substances. Wear safety goggles, safety shoes, and insulated gloves when handling or using cylinders. An eye wash station and drench shower should be readily available near handling and use areas. **DO NOT** wear contact lenses in the laboratory.

SECTION VIII. SOURCE DATA/OTHER COMMENTS

Sources: MDL Information Systems, Inc., MSDS *Methane Gas*, 15 December 2003.

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The reference values for this material are given in the NIST Report of Investigation.